

## **Team Formula EV Semester 2**

### **Minutes of meeting on September 3, 2013, 12:30 PM**

Dylan Waterman (Junior EE) wants to help out w/ our project.

Wait for email from Jaz about funding location.

Design review in a couple weeks (well organized timeline, how we are going to get to our goals).

Order parts when ready.

Funding: \$3500 for two teams.

Ask manufactures for samples!

Maria Pregitzer talk about promoting

Email Hess design review power point from last semester.

Agenda 09/10/13:

- Status update on parts

## **Minutes of meeting on September 10, 2013, 12:30 PM**

Debbie in NIATT tell Jaz sent us. (debbief@uidaho.edu)

Meeting 5pm on Thursday 09/12/13

5 people joining us. 2nd senior design team (rapid charge, w/regen)

Our room is power lab 102C. Previous batteries used by hybrid teams are in 102C.

Battery safety sheet online.

- Enclosure
- Batteries
- Testing Batteries
- Record data

Design Review Oct. 8th

Battery box out of temp material may make point at design review.

Informational meeting - 5pm Thursday.

- What project is
- What they can do to help
- Once we get batteries, they can help us....

Sponsors, sponsors, sponsors

Agenda 9/17/13

- Update on battery arrival date
- Update on design
- Discuss testing procedures
- Describe how we are going to interface w/us and other team.

## **Minutes of meeting on September 17, 2013, 12:30 PM**

Think about test setup (want it safe)

Labjack - ask Robert Fuhrmann about lab jack and data recording system

Use resistor load bank to load test batteries

Send Andy Miles final report and powerpoints

See Bashford's thesis for battery testing

Flywheel setups for battery testing

Send Jaz BMS and Battery cost

Thermodynamic calculation force convection

Talk to Jaz about calculation

### **Agenda 09/24/13**

- Battery update/ arrival date
- Jaz to update w/ test motor flywheel info
- Test setup info (batteries, fuses, resistor load bank, switch, etc)
- Updated Timeline

## **Minutes of meeting on September 24, 2013, 12:30 PM**

Batteries have been ordered 09/24/13

- Method to test cell without cycling batteries
- Talk with hybrid team about flywheel setup.
- Talk with Fuhrmann for Simulink/Labjack/battery recording
- Work with ME's to develop battery enclosure

Agenda 10/01/13

- Flywheel update w/ hybrid team
- Paper battery test procedure
- Battery enclosure with ME's
- Blazen to update about management system BMS

## **Minutes of meeting on October 1, 2013, 12:30 PM**

BATTERIES ARRIVED! (Holy shit, calm down dude)

Need to talk with Fuhrmann

Battery company Portland or California for in the following semesters

Also look into American made BMS systems

Full team meeting on Tuesday

Ask manufacturing engineering WSU & University of Wisconsin

Design Review (No powerpoint needed)

Work been done so far

Oct. 8 Design Review

Attend snapshot Oct. 15

Chihan to attend webmasters meeting

Agenda 10/8/13

- Update for flywheel and testing batteries
- Discuss packaging options
- Update on BMS from everyone

10/03/13 Ordered MCCDAQ \$138.95

10/07/13 Ordered BMS & 12 cell modules \$654.01

## **Minutes of meeting on October 8, 2013, 12:30 PM**

Look into connectors for batteries, buss bars.

Resistor bank 6kW. Diamond parallel, series parallel 24kW.

Nichrome load bank in 102B Chris Douglas  
Talk to Rashab about load bank.

Single cell heat transfer simulation

All team meeting at 4:30 or 5pm

Computerized battery model Simulink  
Charged vs. discharged

Small scale battery box, Simulink model, Bashford Ulrich hybrid formula Simulink model

Test data to give battery characteristics

## **Minutes of meeting on October 15, 2013, 12:30 PM**

BMS is here!!!!

Greg Room GJ101 Tools

Wikipage - Chihan

Reschedule full team meeting.

Block model of batteries and Test Setup

Agenda 10/22/13

- Update on test setup
- Results thus far
- Update from structures team
- Chihan to update on wiki page

## Minutes of meeting on October 22, 2013, 12:30 PM

Update on test setup:

BMS arrived and pin out connections were terminated. BMS connected to computer, firmware update, and BMS works great! Can view data. Going to read into everything about the BMS.

Results thus far:

Still doing initial testing, but am pretty happy the battery management system worked on first try! Greg is going to build us cables.

Update from structures:

Have them working on a heat transfer model. They're making a basic transfer model to test and see how it works then we are going to give them our parameters. Also meeting with them on Thursday at 3:30pm to discuss containment vessel options.

Chihan - Wiki page

Quick Meeting with Gillette Zenner:

- Single cell voltage min-max
- Time to discharge from full range
- Ohmic power generation from + to - terminals
- $\text{Power} = VI = V^2/R = i^2 * R$
- Temperature range from charge to discharge

Final Deliverables

- Final report
- Website
- Logbook
- Poster
- Presentation (between return from thanksgiving and dead week)

Agenda Next week

- Update on battery testing
- Conclusive results from battery testing
- Update from structures
- Single cell model
- Containment vessel
- Chihan Wikipage update

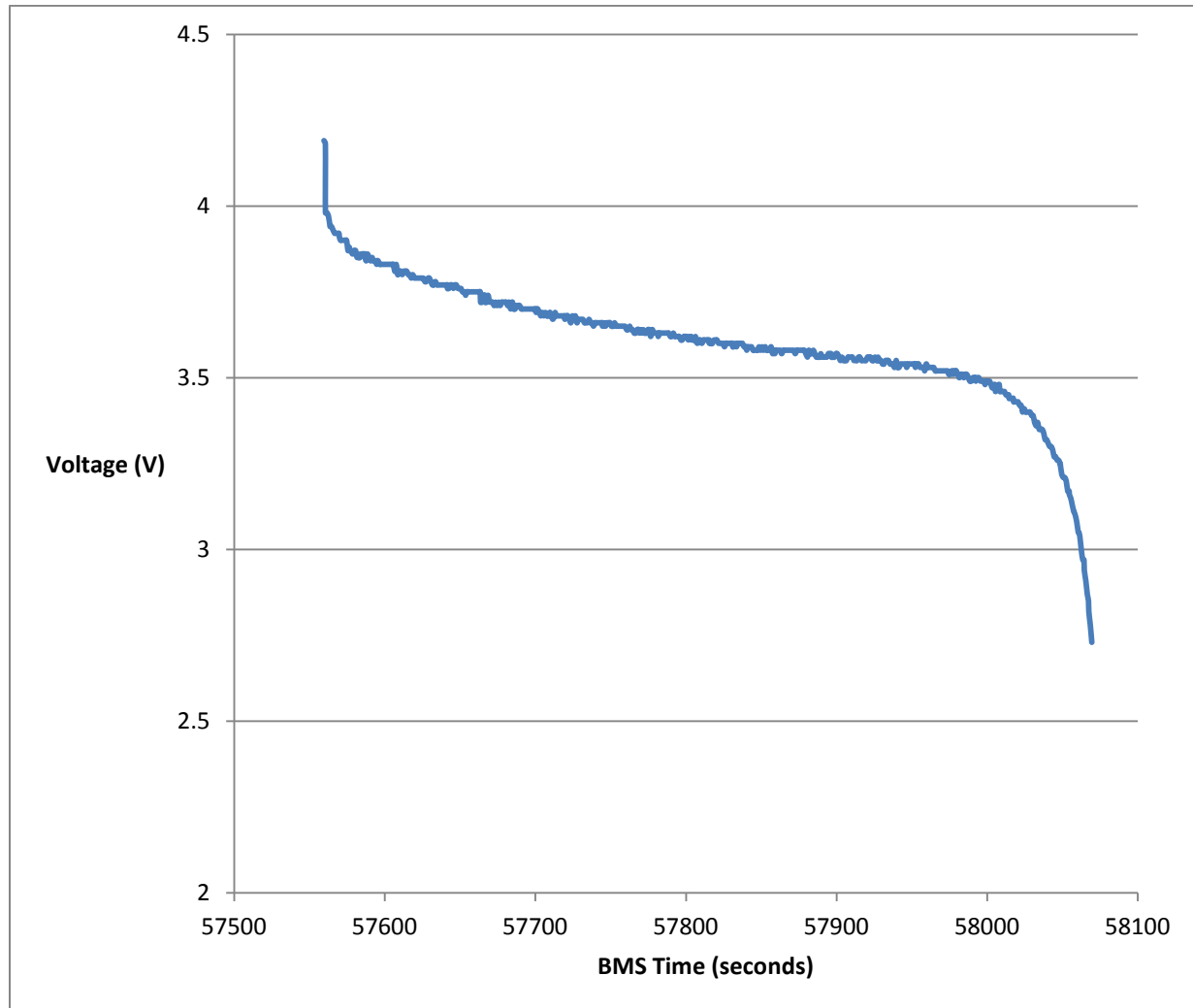


### Meeting notes for November 3, 2013

Met in BEL 102C and discussed our test setup.

### Meeting notes for November 4, 2013

Completed single cell #2 test with nichrome bank



This test was conducted over 8 minutes at 20 second intervals. The entire was conducted with a single battery breaker, nichrome bank, and current sensor.  $R_{\text{nichrome}} = .088\text{ohms}$ .  $R_{\text{nichrome}}$  was calculated from the voltage vs. current measurements.

Our results represent a typical battery discharge curve so that is good!!!

**Meeting notes for November 5, 2013**

No one showed up at meeting, so meeting was moved to the lab.

INSERT FULL BATTERY TEST RESULTS HEREEEEEEEE

### **Minutes of meeting on November 12, 2013, 12:30 PM**

Met with entire team in the formula hybrid shop to determine the approximate space that we have for our overall full scale battery system. Also talked with Jaz about having her help us on the single cell Simulink model considering this task wasn't brought up till October 8th, and none of the EEs on the team have ever used Simulink before.

### **Minutes of my life I wish I could have back for November 14, 2013**

Met with battery and structures team to try and create a Simulink model of batteries with Jaz, but Simulink had errors and nothing was accomplished.

Goals to finish semester:

#### **1. Design report**

- Need to update context/text
- Already have overall structure
- Update title page/template

#### **2. Design poster**

- Update content

#### **3. Finished product**

#### **4. Snapshot (Mini Expo)**

- Poster
- Finished product
- Demonstration of finished product

#### **5. Logbooks**

#### **6. Wikipage ([http://mindworks.shoutwiki.com/wiki/Team\\_EV](http://mindworks.shoutwiki.com/wiki/Team_EV))**

- Pictures
- Battery test plots

### **Meeting notes for November 20, 2013**

Purchases for Nylon all thread, nuts, and washers have been made  
\$27.75 + shipping

Talked with Brad Schenck in the facilities department to get aluminum and copper stock to make conducting blocks and also aluminum spacers/heatsinks.

11/22/13 update: shipping = \$5.32

Total cost is \$33.07

### **Meeting notes for November 22, 2013**

Met with Gillette to update him on the work that the battery team has completed. Ordered copper and aluminum stock (\$~100) to be machined after Thanksgiving break. After machining, begin to build final product for snapshot.

Thanksgiving break work:

### **Meeting notes for November 25, 2013**

Soldered ring terminals on cell modules

Began working on final design poster

Called commons copy center

printing semi gloss \$20/ft = \$80

Mounting 36" x 48" \$54.99

Estimate \$134.99

Took pictures of batteries and cell modules for final poster

Updated text on poster

Wikipage needs to be updated

### **Meeting notes for November 26, 2013**

Progress made on table of contents

file: finalreportFA13.txt

Need to expand on table of contents and make each heading of table of contents into a paragraph/page in report.

Ordered Delrin non conducting material 1/4", 1/2" thick also lock washers